# Distributed Energy Program

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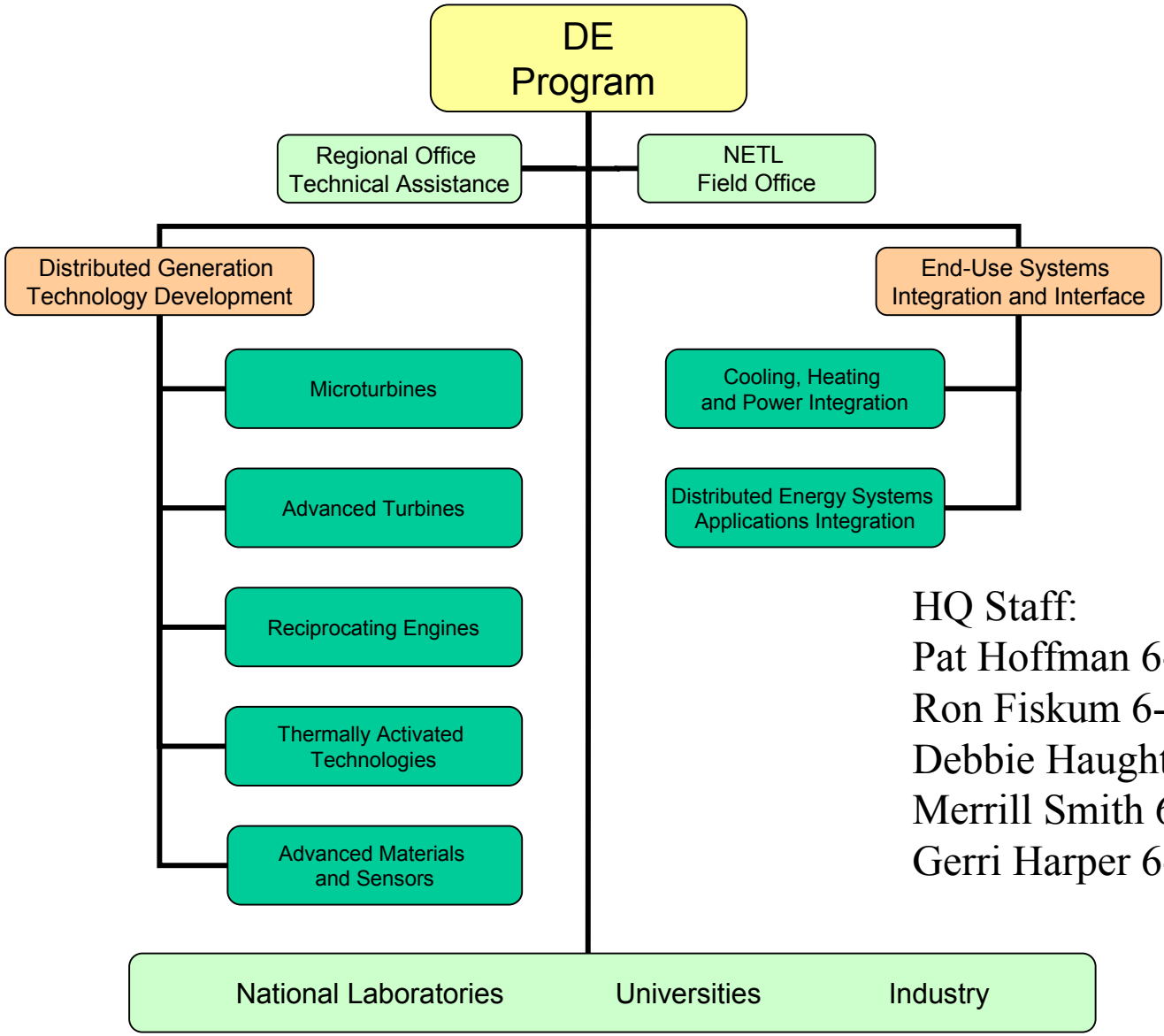
December 2, 2003
Distributed Energy Peer Review

# Distributed Energy Program

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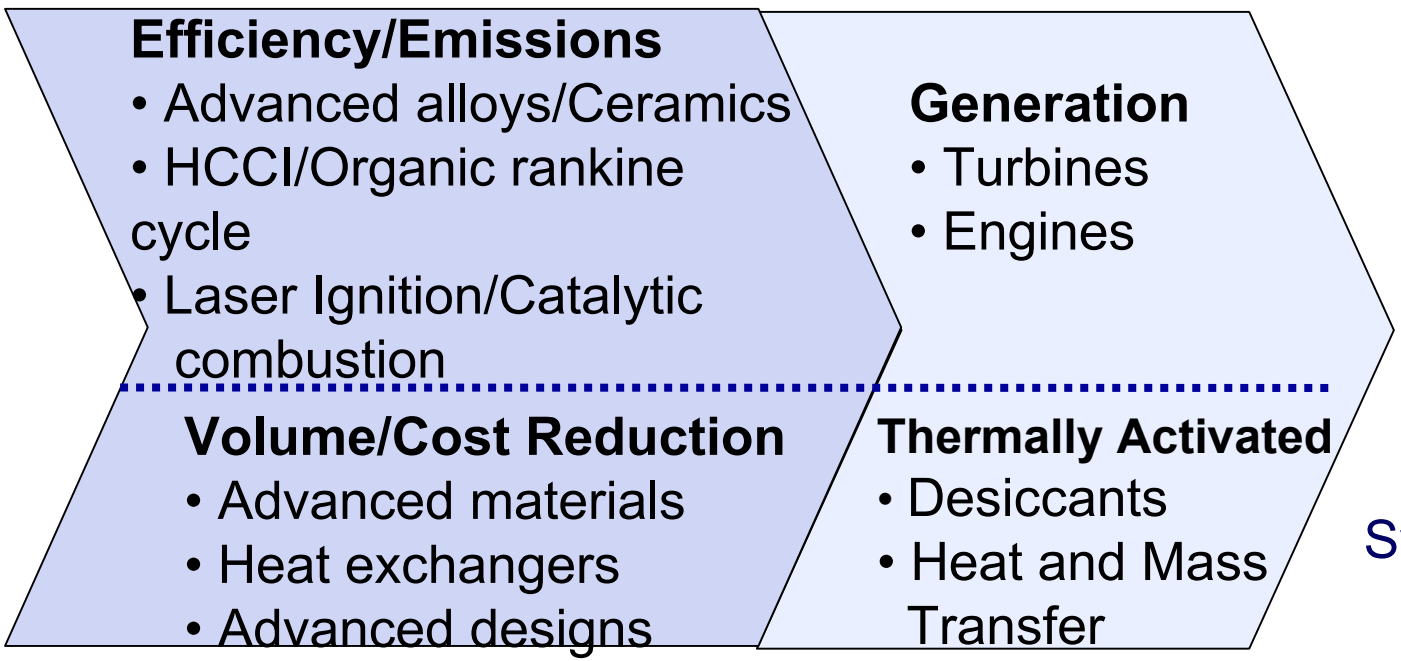
# Goal #1

By 2008, DER will complete development and testing of a portfolio of distributed generation and thermally activated technologies that will show an average of **25 percent increase in efficiency** (compared to 2000 baseline) with **NOx emissions of less than 0.15grams/KWh** at an **equivalent of 10% reduction in cost.**



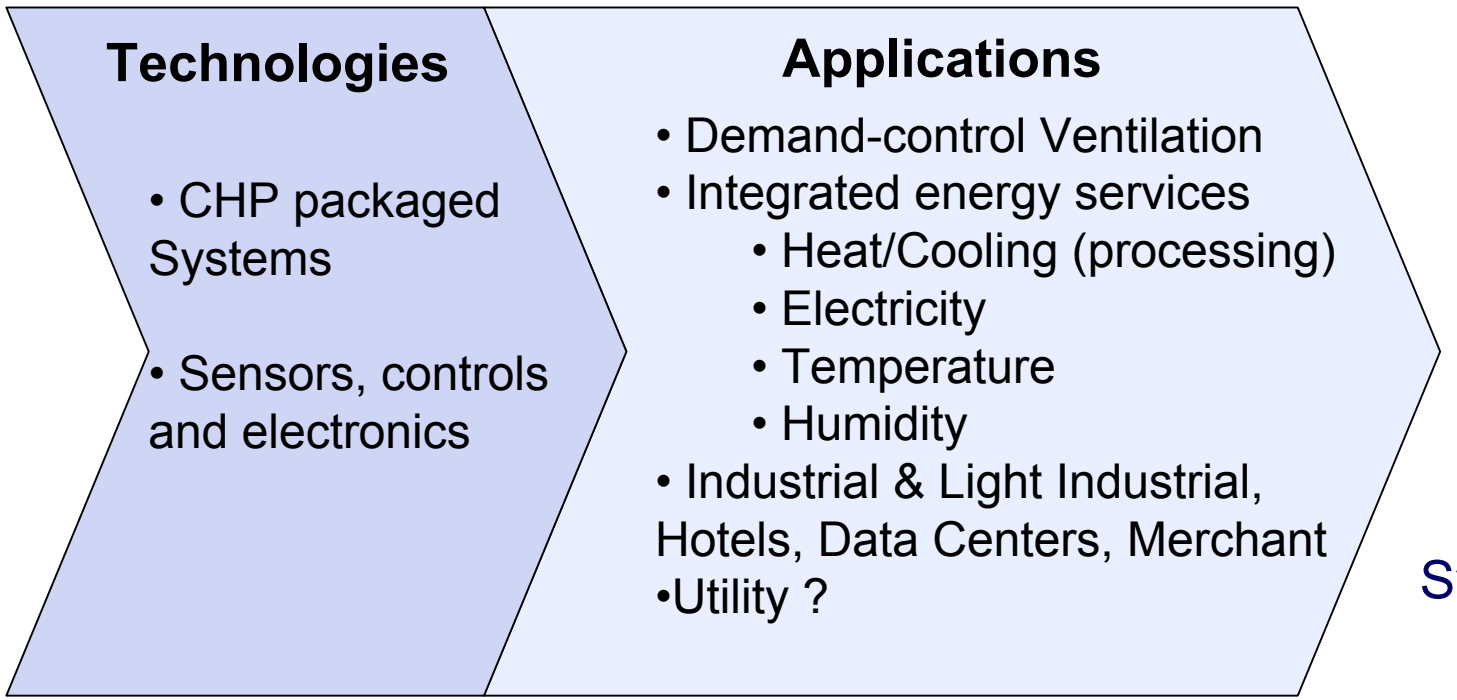

*Government*
Technology Development

**Partnership**

*Industry*
Systems Integration

# Goal #2

By 2008, demonstrate the feasibility of **integrated systems in three new customer classes**, which could achieve **70% efficiency** and customer **payback in less than 4 years**, assuming commercial scale production.




*Government*
Technology Development

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# Goal/Secretarial Milestones

**The Distributed Energy Program's goal is to develop and deploy a diverse array of integrated distributed generation and thermal energy technologies at market competitive prices so that homes businesses, industry, communities and electricity companies elect to use them. This will help the Nation by increasing the efficiency of electric generation, delivery and use.**

- Annual milestones in the Congressional Budget
  - FY2003 results
    - Completed 4000 hour field test of ceramic composites in industrial gas turbines
    - Complete 12 beta field test of high efficiency natural gas-fired heat pumps (chiller precursor technology)
    - Contracted with three companies to research a 5 percentage point increase in efficiency for an industrial microturbine
  - FY2004
    - Complete final design and initiate testing of a low emissions technology with <7 ppm NOx
    - Complete and demonstrate (1.4 COP) commercial introduction thermally activated heat pump
    - Demonstrate 6 percentage point increase in efficiency for a reciprocating engine
    - Complete final design and initiate field testing for a fully functional integrated CHP system (turbine, absorption chiller and control system)
  - FY2005 (proposed)
    - Demonstrate NOx emissions levels of 0.25 lbs/MWh from catalytic combustion
    - Complete case study on a chp installation that uses heat from a microturbine to provide plate tank heating and sludge drying at an industrial facility
    - Complete two projects within the high tech industry

# Office of Management and Budget (OMB)

- Program Assessment and Rating Tool (PART)
  - DE scored a 68 out of 100
- Budget examiner has expressed concern over
  - Yearly metrics vs yearly progress
  - Gas turbine activities and the reciprocating engine activities

# OMB PART Metrics

- Microturbine Efficiency

| | Target | Actual |
|---|---|---|
| 2000 | 28% | 28% |
| 2001 | 28% | 28% |
| 2002 | 28% | 28% |
| 2003 | 33% | 33% |
| 2004 | 33% | |
| 2005 | 35% | |
| 2006 | 35% | |
| 2007 | 35% | |
| 2008 | 37% | |

- Microturbine NOx Emissions (lbs/MWh)

| | Target | Actual |
|---|---|---|
| 2000 | 0.7 | 0.7 |
| 2001 | 0.7 | 0.7 |
| 2002 | 0.7 | 0.5 |
| 2003 | 0.4 | 0.33 |
| 2004 | 0.4 | |
| 2005 | 0.3 | |
| 2006 | 0.3 | |
| 2007 | 0.3 | |
| 2008 | 0.15 | |

# OMB PART Metrics

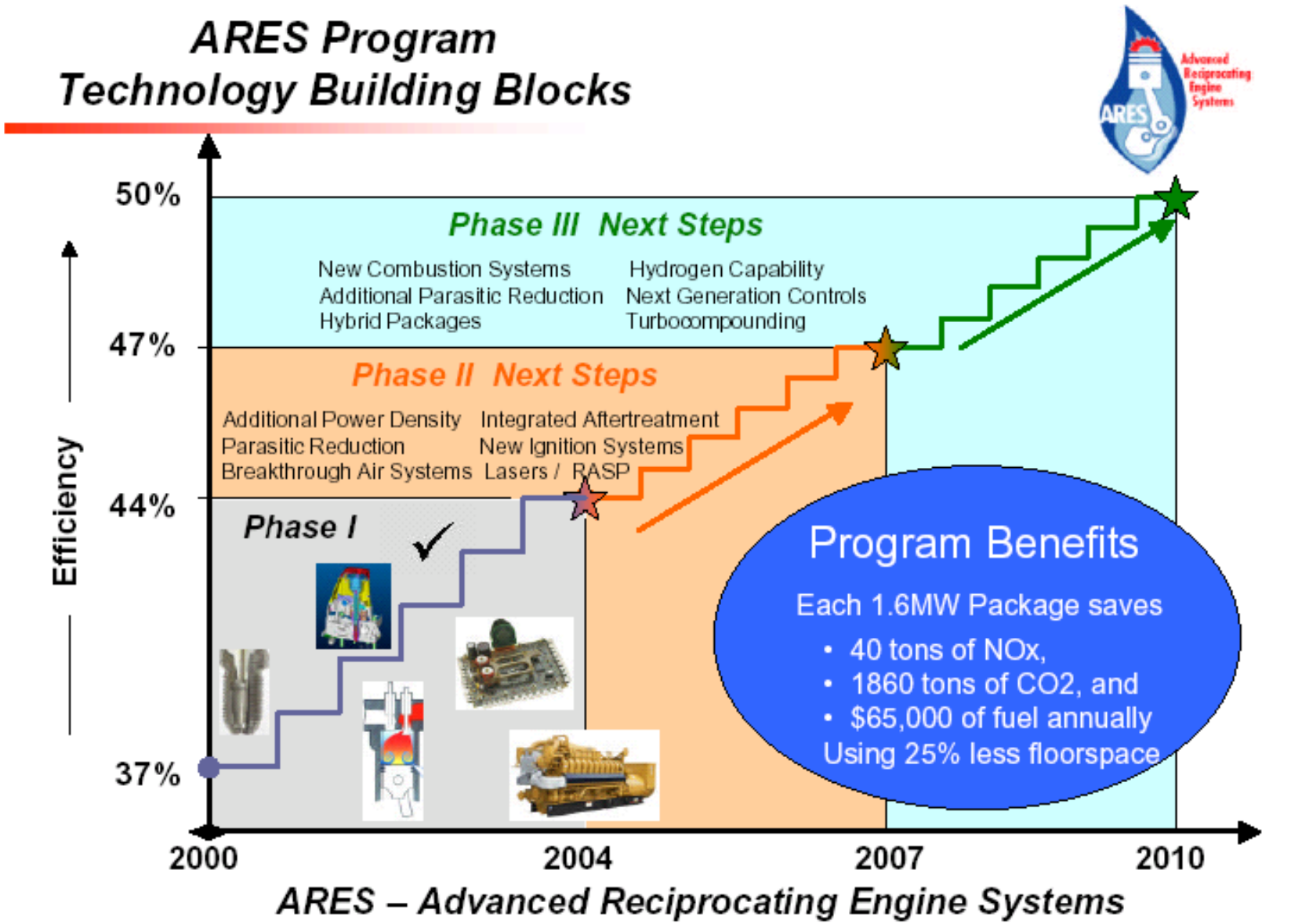
- Reciprocating Engine Efficiency

| | Target | Actual |
|---|---|---|
| 2000 | 36% | 36% |
| 2001 | 38% | 38% |
| 2002 | 38% | 39% |
| 2003 | 38% | 42% |
| 2004 | 43% | |
| 2005 | 44% | |
| 2006 | 44% | |
| 2007 | 46% | |
| 2008 | 47% | |

- Reciprocating Engine NOx Emissions (lbs/MWh)

| | Target | Actual |
|---|---|---|
| 2000 | 3.1 | 3.1 |
| 2001 | 3.1 | 3.1 |
| 2002 | 3.1 | 3.1 |
| 2003 | 1.5 | 1.5 |
| 2004 | 1.5 | |
| 2005 | 1.5 | |
| 2006 | 1.5 | |
| 2007 | 0.75 | |
| 2008 | 0.75 | |

# ARES Program Goals




October 2003

# DER Funding Summary
## ($M)

| Program Element | Fiscal Year 2003 | Fiscal Year 2004 |
|---|---|---|
| INTERIOR | | |
| Industrial Gas Turbines | 5.0 | 4.0 |
| Microturbines | 7.0 | 7.0 |
| Reciprocating Engines | 12.0 | 14.0 |
| Technology Base | 8.26 | 8.26 |
| Thermally Activated Technologies | 7.66 | 7.66 |
| Fuel Flexibility (oil) | 0.750 | (0.500 -move to Bldgs) |
| Industrial DG/High Tech/Controls | 8.34 | 8.34 |
| Packaged Systems R&D/CHP | 12.0 | 12.0 |
| TOTAL INTERIOR | 61.01 | 61.26 |

**Issues:**

-0.42% general reduction

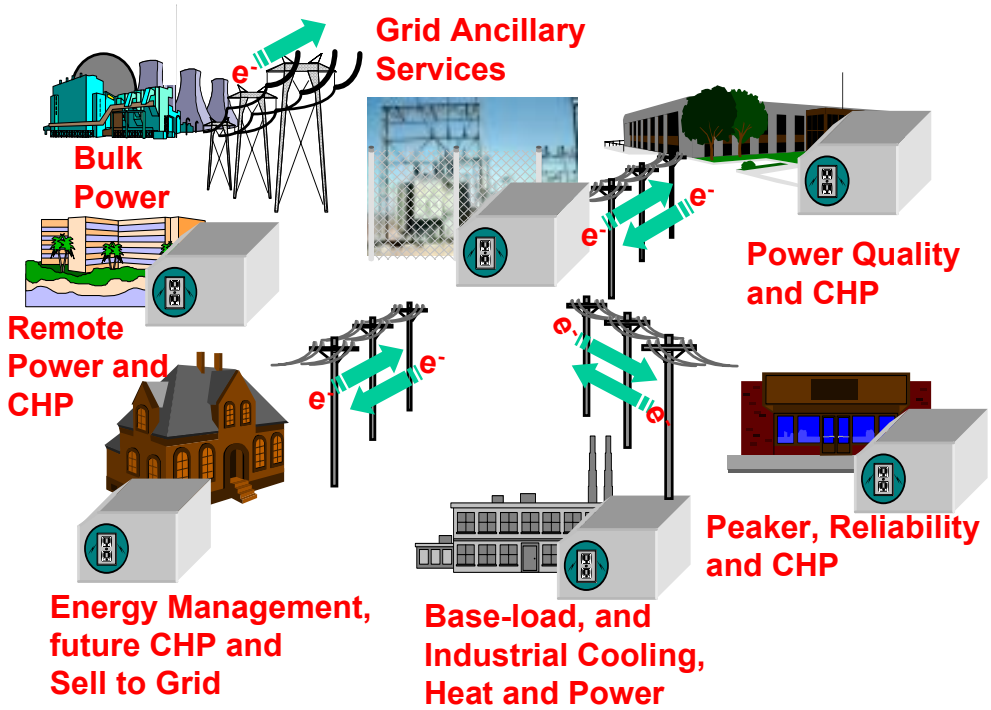
-0.646% committee reduction

-corporate activities (analysis including gpra, communications etc) ~10%

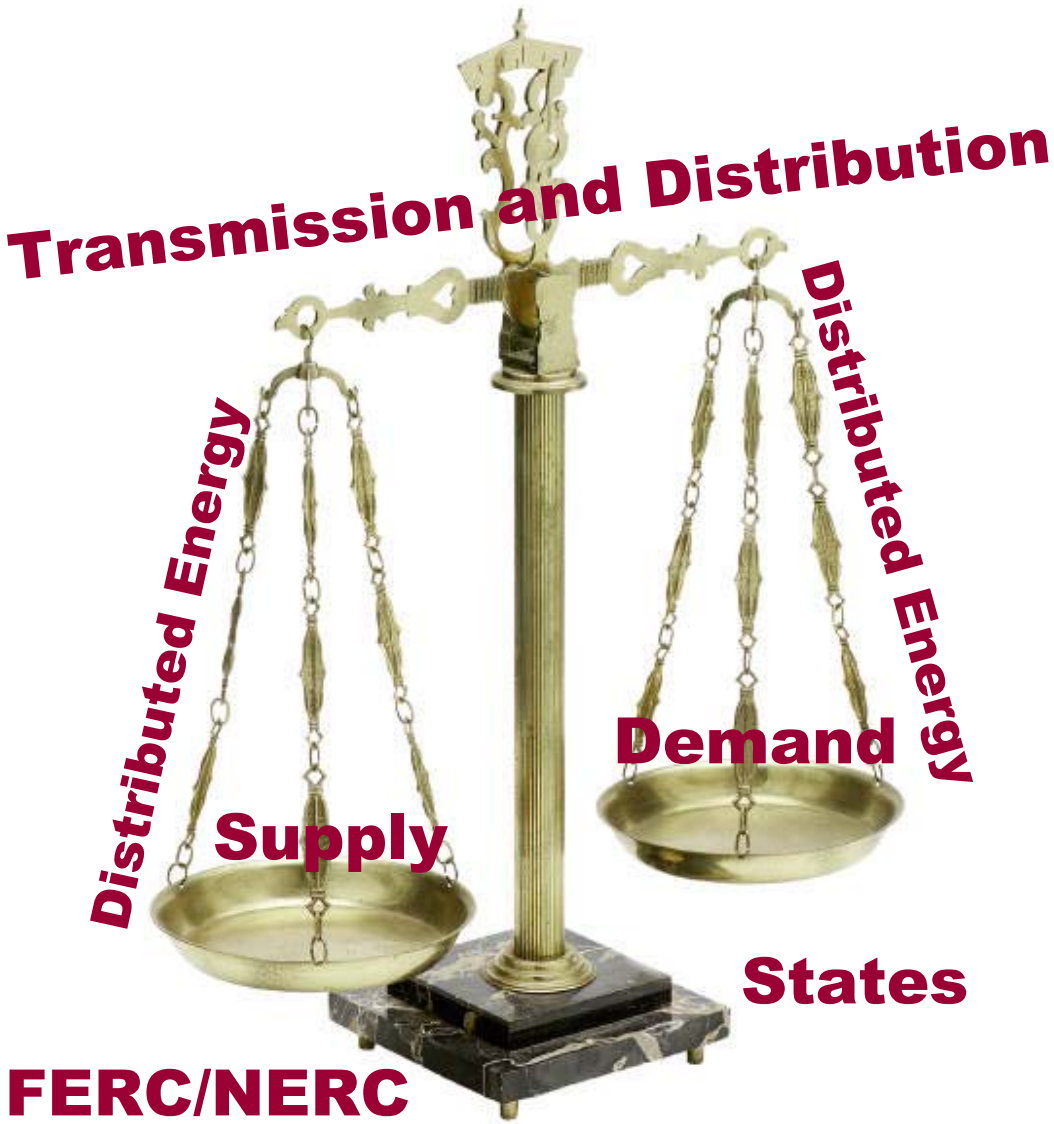
-Earmark – American Gas Foundation – National Accounts

# The Distributed Energy Vision

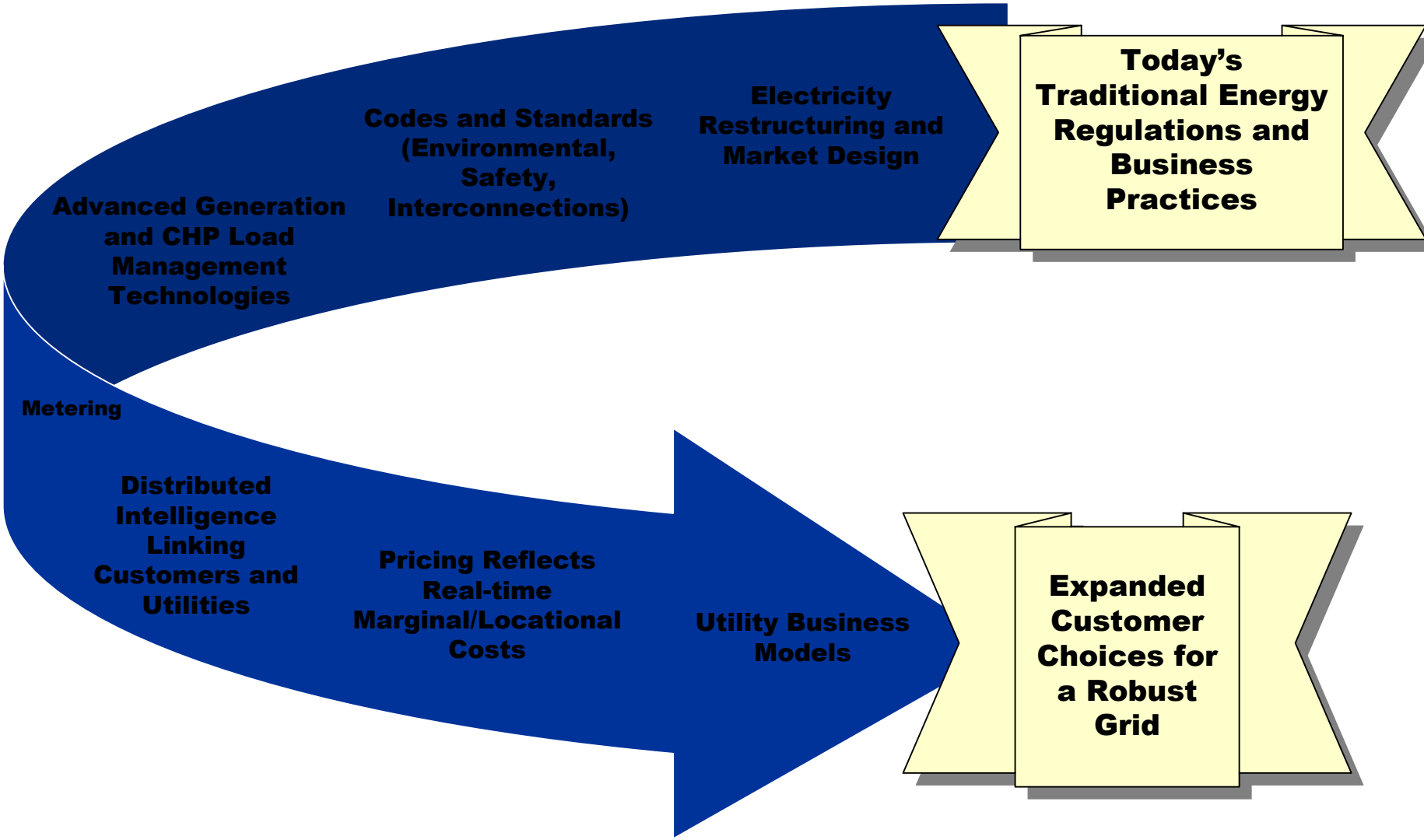
- Distributed energy provides utilities and customers with tools in managing supply and demand.
  - Positive recognition among the utilities
  - Greater customer penetration
  - Clear “rules of the road”



# Balancing Act



# Pathway to an Integrated Energy System



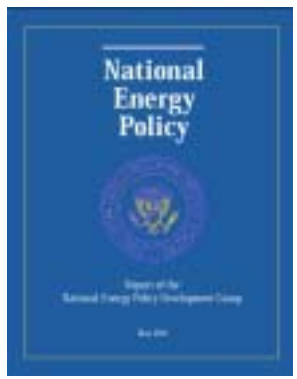
# Expectations

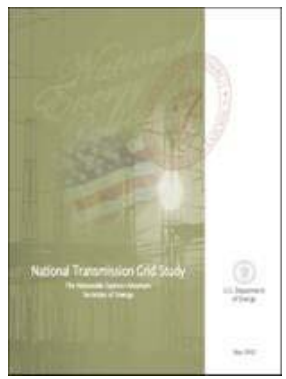
- Iron out metrics/milestones
- Focus regionally on policies/rules that are working – Regional Offices/State program
- Focus  new analysis on New York State and the PJM region
- Solidify relationships with OETD and OEA

# U.S. Department of Energy

- Distributed Energy Program
  - Office Energy Efficiency and Renewable Energy
  - Small generation/cooling, heating and power technologies
  - State Support
  - Support OETD (limited distribution support)
  - Customer focus
    - C&I
    - Residential
    - Utilities?
  - Budget: House- $64.284 M
  - Senate- $57.534 M

- Office of Electric Transmission and Distribution
  - Direct Report to the UnderSecretary of Energy
  - Focus on Transmission and Distribution
- Policy
  - Lead on Blackout Investigation
  - Grid Technologies (superconductivity, storage, interconnection)
  - Budget: House- $73.616 M
  - Senate-$92.838 M



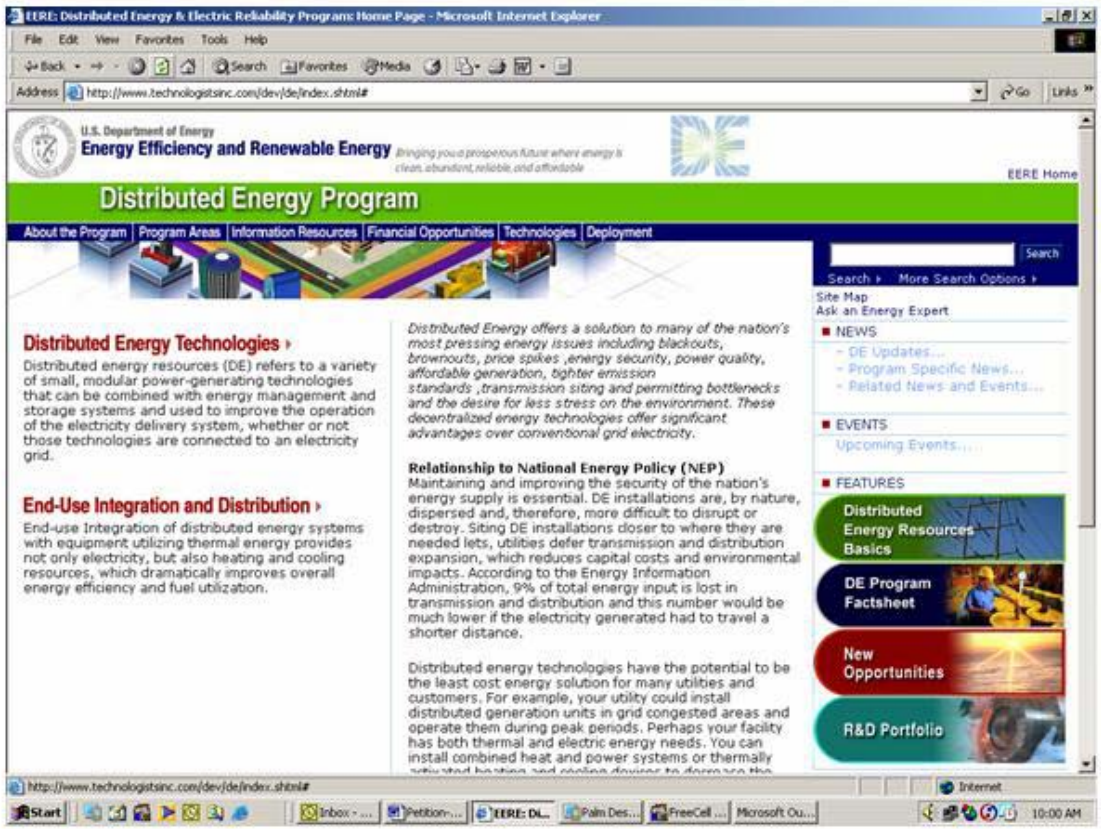




OETD Vision and Roadmap

# Information Clearinghouse and Networking

New look coming soon

## www.eere.energy.gov/der




- Technical publications
- Workshops and conferences
- Technology planning
- Cost-shared RD&D
- Solicitation announcements

- Distributed Energy Peer Review- December 2-4 2003, Washington DC
- 4th Annual Microturbine Applications Workshop – January 20 – 22, 2004, Marina del Ray, CA